Modified Insall Procedure for Recurrent Patellar Dislocation: A Case Report of Four Cases

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Abstract

Many surgical techniques for the treatment of recurrent patellar dislocation have been described in the literature. We report four cases of recurrent patellar dislocation in which the patients underwent arthroscopic lateral release and advancement of the medial patellofemoral ligament (MPFL). The attachments between the MPFL and the peripatellar retinaculum and periosteum were strengthened with 2 anchor sutures and Ethibond sutures. The patients’ symptoms improved after surgery, and no recurrence of their symptoms has been observed since. Our procedure is simple and minimally invasive. We consider that our technique is preferable to MPFL reconstruction with a hamstring graft and so might become the first-choice procedure for recurrent patellar dislocation.

Introduction

It has been suggested that recurrent dislocation, subluxation, and functional instability due to patellofemoral pain are experienced by 30% to 60% of patients with post-traumatic patella instability who are managed with non-surgical methods [1-3]. Recently, the medial patellofemoral ligament (MPFL) has been recognized as the most important ligamentous stabilizer for preventing lateral dislocation of the patella [4-7]. Thus, the use of the MPFL during reconstructive treatment for recurrent patellar dislocation has been increasing [8, 9]. However, hamstring grafts, which are often used during such procedures, have the potential to cause patellofemoral overload. Elongated MPFL can be advanced to restore patellofemoral stability, as Fulkerson has reported [10]. We report the cases of four patients with recurrent patellar dislocation who underwent arthroscopic lateral release and MPFL advancement using a new fixation technique.

Case 1

A 35-year-old female had been suffering from recurrent dislocation of her right patella, without any obvious cause, since the age of 12. In the year prior to diagnosis, patellar dislocations had been occurring more frequently, and the patient had suffered slight pain in her right knee. Therefore, she was referred to our department for treatment. As for her physical findings, her left knee joint was slightly swollen, but it was not tender, and her range of motion was not limited. A meniscal test and a ligamentous instability test both produced negative results. The patient exhibited the patellar apprehension sign and had a preoperative Kujala score of 59 [14]. X-rays did not detect any patellar fractures (Fig. 1). Magnetic resonance imaging (MRI) confirmed that subluxation of the patella had occurred and that the MPFL had been elongated, but did not show any meniscal tears (Fig. 2). Lateral release was performed arthroscopically. The attachment of the MPFL to the patellar insertion of the vastus medialis obliquus (VMO) was identified, and the two structures were detached. The MPFL was released from the capsule. After advancing the MPFL 2.5 cm to the lateral side, it was sutured to the peripatellar retinaculum and periosteum using 2 anchor sutures and Ethibond sutures. In addition,
the VMO was advanced 1.5 cm to the peripheral side and sutured to the peripatellar retinaculum and periosteum with Ethibond sutures (Fig. 3). After surgery, the patient wore a knee brace for 3 weeks, and then continuous passive motion was started. Her knee was kept in a non-weight-bearing state for 6 weeks. The patient’s symptoms were ameliorated after surgery, and her Kujala score improved to 95. A radiograph demonstrated decreased lateral tilt at 30 degrees of knee flexion and showed the anchor sutures that had been inserted into the patella (Fig. 4A,B). No recurrence of the patient’s symptoms has been observed in the 2 years since the surgery.

Case 2
A 20-year-old male had suffered a sprain to his left knee while playing volleyball two years prior to diagnosis. Thereafter, he had periodically experienced a sensation of dislocation of the patella. Three weeks prior to diagnosis, he dislocated his left patella after standing up from a chair. He underwent reduction and casting at a nearby hospital. His physical findings were as follows: Slight swelling was observed in his left knee joint, and the medial condyle of his femur was tender, but his range of motion was not limited. He exhibited the patellar apprehension sign, and his preoperative Kujala score was 70. X-ray images did not show any patellar fractures. MRI confirmed the presence of a tear on the femoral side of the MPFL, but did not detect any meniscal tears. Two months later, lateral release was performed arthroscopically. The MPFL was advanced and sutured to the peripatellar retinaculum and periosteum using 2 anchor sutures and Ethibond sutures. After surgery, the patient’s symptoms were ameliorated, and his Kujala score improved to 98. No recurrence of the patient’s symptoms has been observed in the 3 years since the surgery.

Case 3
A 31-year-old male had been suffering from recurrent dislocation of his left patella, without any obvious trauma, for ten years. He had dislocated his left patella while descending a slope 2 weeks prior to diagnosis. His physical findings were as follows: Swelling was observed in his left knee joint, and the medial condyle of his femur was tender. His range of motion was 0° to 90°. He exhibited the patellar apprehension sign, and his preoperative Kujala score was 54. X-ray images showed an old fracture of the patella. MRI confirmed that subluxation of the patella had occurred and that the MPFL...
was elongated, but did not detect any meniscal tears. Two months later, lateral release was performed arthroscopically. The MPFL and VMO were advanced and sutured to the peri patellar retinaculum and periosteum using 2 anchor sutures and Ethibond sutures. After surgery, the patient’s symptoms were ameliorated, and his Kujala score improved to 94. No recurrence of the patient’s symptoms has been observed in the 2.5 years since the surgery.

Case 4

A 14-year-old female had suffered a sprain to her left knee upon falling two months prior to diagnosis.

Thereafter, she had periodically experienced a sensation of dislocation of the patella. Two weeks prior to diagnosis, she dislocated her left patella while walking. She underwent reduction and casting at a nearby hospital. Her physical findings were as follows: Swelling was observed in her left knee joint, and her medial femoral condyle was tender. Her range of motion was limited. She exhibited the patellar apprehension sign, and her preoperative Kujala score was 72. X-ray images did not show any patellar fractures. Lateral release was performed arthroscopically. The MPFL was advanced and sutured to the peri patellar retinaculum and periosteum using Ethibond sutures. After surgery, the patient’s symptoms were ameliorated, and her Kujala score improved to 97. No recurrence of the patient’s symptoms has been observed in the 3 years since the surgery.

Discussion

Patellar dislocations occur due to morphological abnormalities of the patellofemoral joint or soft tissue balance disorders [12,13]. Cases of chronic patellar dislocations in which the condition is permanent or some degree of habituation has occurred are associated with lateral contraction of the patella and the extensor muscle group and hypoplasia of the patellar groove [3,14]. Many surgical techniques for the treatment of recurrent patellar dislocation have been described in the literature [13-17]. In general, these procedures involve the release of tight lateral ligaments, the tensioning of loose medial structures, the distal realignment of the extensor mechanism, or a combination of these approaches.

Recently, the MPFL has been recognized as the most important ligamentous stabilizer for preventing lateral dislocation of the patella [4-6,12]. Warren and Marshall described the anatomy of the medial capsular ligament of the knee by dividing it into 3 layers, and they particularly focused on the MPFL [18]. The MPFL is a band of retinacular tissue connecting the femoral medial epicondyle to the medial edge of the patella. The MPFL is approximately 55 mm long, and its width has been reported to range from 3 to 30 mm [7]. The distal part of the VMO overlaps the MPFL although the extent to which the two structures overlap varies, and the fibers of the MPFL extend into the deep aspect of the muscle. Despite the MPFL being very thin, it has a mean tensile strength of 208 N [19]. In biomechanical studies, various authors have reached the conclusion that the MPFL accounts for approximately 50% to 70% of total lateral restraint, which makes it the primary medial stabilizer of the patella [4,5,12,19-21]. Hamstring grafts have a mean tensile strength of 1600 N [19]. Therefore, holding the patella medially with a hamstring graft might cause overloading due to the different tensile strengths of these structures. Elias reported that small errors in graft position and length can dramatically increase the force and pressure on the medial patellofemoral cartilage and potentially lead to degeneration, pain, and arthrosis [22].

In cases of patellar dislocation, we find that the MPFL is often clearly identifiable. In addition, although the MPFL nearly always ruptures at its femoral insertion and is elongated, it usually heals; i.e., becomes re-attached to the adductor tubercle. Our procedure involves the lateral release of the MPFL followed by its advancement 2.5 cm to the lateral side, where it is sutured to the peripatellar retinaculum and periosteum with 2 anchor sutures and Ethibond sutures. Advancement of the MPFL to the lateral side is a reasonable way of re-shortening it. The anatomical position of the shortened MPFL within the 3 abovementioned layers is unchanged. Even when the MPFL is advanced, it exhibits less tensile strength than hamstring grafts attached to the medial patellofemoral joint. Furthermore, our procedure is very simple. Nam reported on a similar procedure for the treatment of recurrent patellar dislocation and obtained favorable outcomes [23]. Our procedure is a modified technique designed to strengthen the suturing between the advanced MPFL and the peripatellar retinaculum and periosteum. This technique is minimally invasive and can be used to treat recurrent patellar dislocation.

References


